

CLAIMS

1. A laser light source comprising:
plural semiconductor lasers; and
a waveguide for transmitting light;
wherein plural laser beams which are emitted from the plural semiconductor lasers and enter the waveguide propagate in the waveguide to be emitted to the outside from one end face of the waveguide.
2. A laser light source as defined in Claim 1 wherein said plural semiconductor lasers are arranged in a direction where spread angles of light beams emitted from the respective semiconductor lasers are relatively small.
3. A laser light source as defined in Claim 1 wherein a length L from the light emission end face of the waveguide to the nearest light incident position satisfies a relational expression (1) as follows:
$$L \geq W / \tan(\sin^{-1}(\sin(\theta/2)/n))$$
wherein W is the width of the waveguide, n is the refractive index in the waveguide, and θ is the minimum beam spread angle of the semiconductor laser.
4. A laser light source as defined in Claim 1 wherein

said waveguide has a step difference portion at which the cross-section area of the waveguide varies in the light propagating direction, and

said plural semiconductor lasers are disposed on the step difference portion.

5. A laser light source as defined in Claim 4 wherein said waveguide has plural step difference portions.

6. A laser light source as defined in Claim 1 wherein the semiconductor lasers which are arranged in one line along the direction where the spread angles of light beams emitted from the semiconductor lasers are relatively small are shifted from the semiconductor lasers in the other line in the light emission direction.

7. A laser light source as defined in Claim 6 wherein said waveguide has step portions at which the cross-section area of the waveguide varies stepwise in the light propagating direction, and

said plural semiconductor lasers are disposed on the respective step portions.

8. A laser light source as defined in Claim 1 wherein said plural semiconductor lasers include at least two

semiconductor lasers having different oscillation wavelengths,
and

a maximum oscillation wavelength difference A (A : actual number) of the semiconductor lasers having different oscillation wavelengths satisfies $A \geq 1\text{nm}$.

9. A laser light source as defined in Claim 8 wherein

said plural semiconductor lasers include at least three semiconductor lasers having different oscillation wavelengths,
and

the intervals of adjacent oscillation wavelengths are substantially constant.

10. A laser light source as defined in Claim 8 wherein said maximum oscillation wavelength difference A satisfies $1\text{nm} \leq A \leq 30\text{nm}$.

11. A laser light source as defined in Claim 1 wherein the output light intensities of the respective semiconductor lasers are approximately uniform.

12. A laser light source as defined in Claim 1 wherein said plural semiconductor lasers are multistripe lasers.

13. A laser light source as defined in Claim 1 wherein said plural semiconductor lasers are multistack lasers.

14. A laser light source as defined in Claim 1 wherein said plural semiconductor lasers are arranged so as to constitute at least one laser array.

15. A laser light source as defined in Claim 1 wherein said waveguide has a hollow structure, and a liquid is sealed in the hollow part.

16. A laser light source as defined in Claim 15 further including

a cooling mechanism which is connected to the waveguide, and circulates the liquid sealed in the hollow part of the waveguide, and

said plural semiconductor lasers being cooled by the cooling mechanism.

17. A two-dimensional image forming device including plural semiconductor lasers, a spatial light modulator for modulating light outputted from a laser light source, and a lighting optical system for illuminating the output light from the laser source to the spatial light modulator, wherein

said laser light source comprises

plural semiconductor lasers, and

a waveguide for transmitting light,

wherein plural laser beams which are emitted from the plural semiconductor lasers and enter the waveguide propagate in the waveguide to be emitted to the outside from an end face of the waveguide.

18. A two-dimensional image forming device as defined in Claim 17 further including a projection optical system for projecting output light from the spatial light modulator.